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Durability of reinforced concrete in aggressive sabkha environments

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Abstract: The durability of 15 plain and blended cement concretes exposed to a typical salty sabkha environment (15.7% Clqq + 0.55% SO4qq) was evaluated. The concrete mixtures were designed to assess the influence of C3A content, water-cementitious materials ratio, and type of supplementary cementing material, such as fly ash, silica fume, and blast furnace slag, on sulfate attack and reinforcement corrosion in an aggressive sabkha environment. Despite the high sulfate concentration, results indicated that sulfate attack was totally hindered. Chloride-induced corrosion was mitigated by the following factors in increasing order: C3A content of cement, water-cement ratio of plain cements, and incorporation of mineral admixtures. Most significantly, water-to-cementitious materials ratio was synchronously reduced with addition of silica fume.